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P O L I T E A R T S.

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## P O L I T E   A R T S.

*In the Year 1770, Mr. THOMAS GRENVILLE, the Inventor of the Machine for teaching Blind Persons Arithmetic, described in the following Pages, attended, and worked several Sums in Addition, Multiplication, and Division; and the Society, considering the Contrivance as new, simple in its Construction, very ingenious, and likely to prove of great Utility to Persons labouring under the Misfortune of being Blind, voted Mr. GRENVILLE a Bounty of Fifteen Guineas, on Condition he left with the Society a complete Machine*

*and Description of it. This Machine remained in the Repository, and had been constantly and uniformly admired by all who examined it, to the Year 1785, when the Society received another Letter from Mr. GRENVILLE, informing them he had made a further Improvement in his Machine; which having been duly examined, the Society voted him their Silver Medal, and purchased one of his last improved Machines, which is reserved in their Repository, and of which a Description and Plate is annexed, with an historical Account of the Invention, communicated by Mr. GRENVILLE.*

*As a Confirmation of the Utility of this Machine, to Blind Persons, it may not be improper to insert the following Letter, addressed to JONAS HANWAY, Esq. by Mr. STANLEY.*

S I R,

SIR,

**T**HOMAS GRENVILLE brought his numerical table to shew me, when he was in town, and left it at my house some days for me to examine ; which I did, and found I was able, in a quarter of an hour, to multiply or substract any sum by it. I do assure you, I think it a most ingenious contrivance, and shall be very glad if my opinion of it will be of any service to the young man, as his ingenuity certainly merits encouragement.

I am, SIR,

Your most humble servant,

JOHN STANLEY.

*Hatton Garden,*  
April 24, 1770.

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My

MY LORDS AND GENTLEMEN,

**I**HAVE by my long study, though unhappily without my sight, completed a Machine, by which any blind person may be taught the rules of Arithmetic, viz. Addition, Subtraction, Multiplication, Division, Reduction, and the Rule of Three; all which I have already proved to the entire satisfaction of those to whom I have communicated this work. It may be done in money, weights, and measures of all kinds, as perfectly as by those who see their work on paper.

I need not urge, that this will be a great amusement to blind people, but I apprehend it may be of real use. I have brought this Machine to town, and will produce it to you, if you think proper, whenever it shall be agreeable to you; and I humbly hope, my Lords and Gentlemen, if you should find  
it

it answer the ends proposed, you, who are the most distinguished encouragers of ingenuity, will think me deserving of some mark of your approbation.

It may be necessary to inform you that I was reared and bred up in the Foundling Hospital, and am now Organist of Rofs, in Herefordshire, and with great respect,

My LORDS and GENTLEMEN,

Your most humble servant,

THOMAS GRENVILLE.

*Covent Garden,*

March 23, 1770.

To the Society for Encouragement of Arts, &c.

*Devonshire Street, March 22, 1785.*

SIR,

I APPREHEND it will be satisfactory to the Society for the Encouragement of Arts, Manufactures, and Commerce, to be acquainted with what gave me the first hopes of being able to work questions by a palpable Machine, and my progressive improvements thereon. I here take the liberty to send the instrument I first made use of to accomplish that end, which, with the hint, was given me by Mr. Thomas, Post-Master, at Ross, in Herefordshire, the description of which is as follows, viz.—

The board has nine perpendicular rows of perforations, (as numbered, 1, 2, 3,  
 &c.

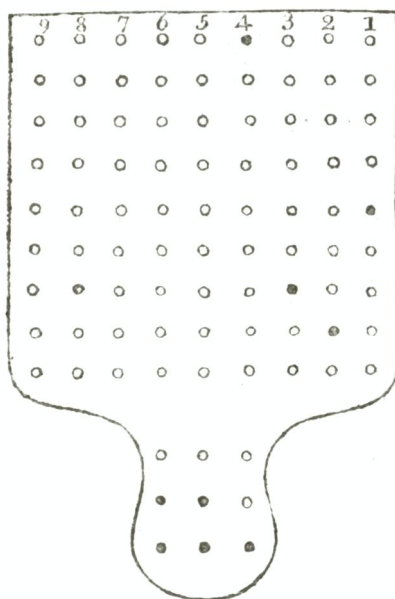


&c.) which represents the value of numbers decimally multiplied, as if written upon paper, beginning at the right hand, and reckoning towards the left, as units, tens, hundreds, &c. The transverse rows of perforations, express only the value of the nine digits, as 1, 2, 3, &c. beginning at the top or broadest end of the board, and reckoning downward towards the handle for 9. The holes in the handle, are only to place the pegs in, when not employed.

To explain the method of expressing a number thereon, I shall suppose that the date of the year is required, which would be performed in the following manner: a peg stuck into the first hole of the fourth row, represents one thousand; another peg in the seventh hole of the third row, represents seven hundred; another peg in the eighth hole of the second row, represents eighty; and the last peg in the fifth

hole of the first row, is five ; which, taken together, is 1785, as shewn in Figure I. where the holes in which the pegs are placed are represented as filled up with ink like a black dot.

Figure I.

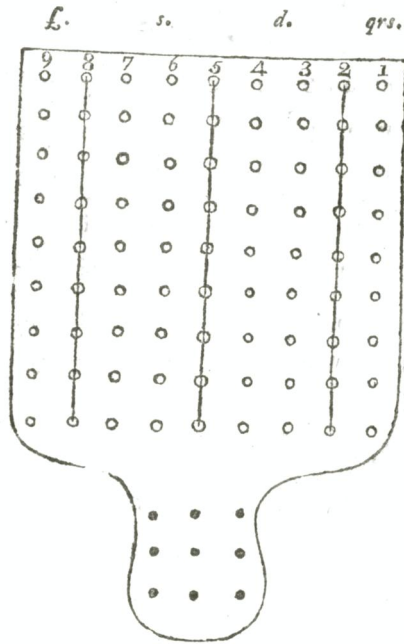


This method of expressing numbers,  
gave me at first great pleasure ; but as  
the

the places in which the pegs were put, and not the pegs themselves, represented figures, my operations were confined to one number at a time only, which caused me soon to grow tired of it; when a thought suggested itself, that if I could make pegs to represent the ten digits, by attaching some distinction to them, I should be able to work many little questions, even upon that narrow scale; and upon trial, found it succeed to my wish. But when I had occasion to work any question of various denominations, (as of pounds, shillings, pence, and farthings) I was obliged to make use of three brass wires to divide the several sums, which being stuck into three rows of the perforations, left me but one row of them for pounds; as for example: see Fig. II. So that I could not express a larger sum than 9l. 19s. 11d.  $\frac{3}{4}$ qrs. In order to recover the three rows thus lost, I contrived to have smaller holes pierced  
between

between the other rows of perforations, to place my separating wires in; by which means I could express any sum to the amount of 9999l. 19s. 11d.  $\frac{3}{4}$ qrs.

Figure II.



I had afterwards an instrument made, perforated in twelve rows, and as many smaller

smaller between them, to fix my division lines in, which enabled me to work much larger, and more complicated questions, than I had before ; and at last, I had another made with eighteen holes each way, and smaller between them (as before), together with the apparatus for containing the figures and division lines, which was the machine I had the honour of presenting to the Society some years since, and which at that time I thought very complete.

But upon reflection I considered that, though my Machine upon such an enlarged scale was of great utility to me, it could afford but little satisfaction to those who had the use of sight, because they, not being acquainted with my marks, could not judge whether a question was performed right, unless they worked it themselves ; wherefore I have, in my last improvement, endeavoured to make my operation of a question, as plain to every person's comprehension, as to myself,

self, by impressing figures on the heads of my pegs, and adding new marks for my own use, which are as follows, viz.

The digit 1, is known to me by a pin's point, placed in the head of the peg on the right hand: 2. is known by the same mark in the middle of the head; and 3, by the same on the left hand: 4, is the head of a pin on the right hand: 5, is the same in the middle; and 6, on the left hand: 7, is a small staple on the right hand; 8, the same in the middle; and 9, upon the left hand.—A cypher is represented without any additional mark than the bare peg itself to make it known.

The Machine, in its present state, gives me great pleasure, because any question, when performed therewith, is now as demonstrable to those that have the use of sight, as if laid before them upon paper. The instrument thus complete, besides the utility it may be of

of to such as are deprived of their sight, may perhaps be thought of service in teaching arithmetic to young children as an amusement, by playing them into the knowledge and value of figures.

If my last improvement should meet with the approbation of the gentlemen of the Society, it will be esteemed a great honour, and give infinite satisfaction to, SIR,

Their and your most obedient

and obliged humble servant,

T. GRENVILLE.

Mr. MORE.

*Descrip-*

*Description of a MACHINE to teach Blind Persons the Rules of Arithmetic, in the Repository of the Society for the Encouragement of Arts, &c.*

IT consists of a Box nineteen inches square in the clear within, and near two inches deep, divided into cells, containing the figures, lines, &c. hereafter described, necessary for performing the rules of arithmetic. The lid or cover of the Box, which serves as a leaf or slate, is pierced full of holes in parallel rows: the first row has eighteen large, and seventeen small holes, alternately placed; the second row, eighteen small holes, placed under the above large ones; the third, as the first, and so on alternately thirty-five rows; the whole cover being full, and containing three hundred and twenty-four large holes, and six hundred



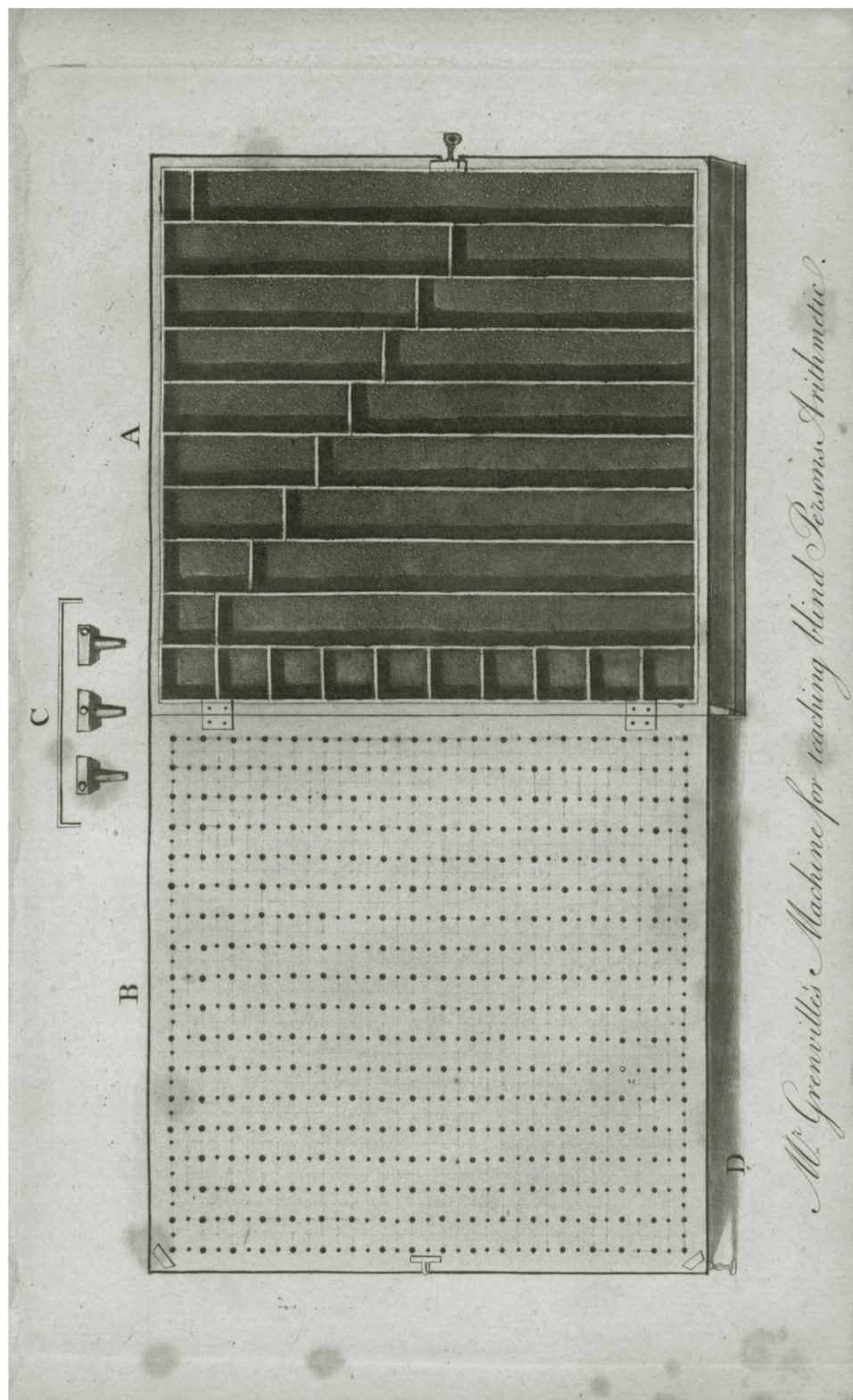
hundred and twelve small ones, which make an exact square.—The figures are represented by pegs with cubical heads, and distinguished by pins placed on one side in the following manner. One is expressed by a pin's point on the right hand; two, by the same in the middle; and three, by having it on the left hand; four, five and six, by pins heads in the above three different situations; seven, eight, and nine, by crooked pins or staples, in the same manner—the cypher is understood by a plain peg without any mark.—On the top of each peg is printed the figure which it represents, to render the work intelligible to any person that may see it without being acquainted with the marks. These pegs were made to fit the large holes.—Pieces of brass wire, bent to a right angle, about half an inch from each end, and made to fit the small holes, serve for the purpose of lines to separate the different parts of the work.

The

The Box contains twenty-eight partitions, situated as in the inclosed plan, ten of them to hold figures, and the others for the lines of different lengths.

*Description of the PLATE of Mr. GRENVILLE's Machine.*

A. The Box, with its several divisions, containing the different pegs, bars, &c. with which the rules in arithmetic are to be performed.—B. The Cover, which, when turned back and standing on its feet as represented, shews the holes wherein the pegs and bars are occasionally placed to shew the value of the figures.—C. The pegs, marked in such manner as to enable the blind person to distinguish by the touch, what each peg is intended to represent when placed in the holes in the Cover B.



*Mr. Grenville's Machine for teaching blind Persons Arithmetic.*